

Industry 4.0 Guide Part 3 – Connecting Production Operations

Posted by Kara on December 20, 2016 // 1 Comment



Connecting production operations is the first step in creating a paperless factory. This can deliver large increases in production efficiency and reduce the lead time of manufacturing products.

Many production systems control product routings manually. A bill of materials and a job routing will be developed for a product, this will be printed out and carried along with a product batch through a factory and various manufacturing operations. This requires planners, supervisors and production operators to review each product routing and decide what should happen next to the product batch.

By connecting manufacturing processes together, a software system can perform

all of this product routing and can communicate directly with production machinery, to select the correct production process for each product batch.

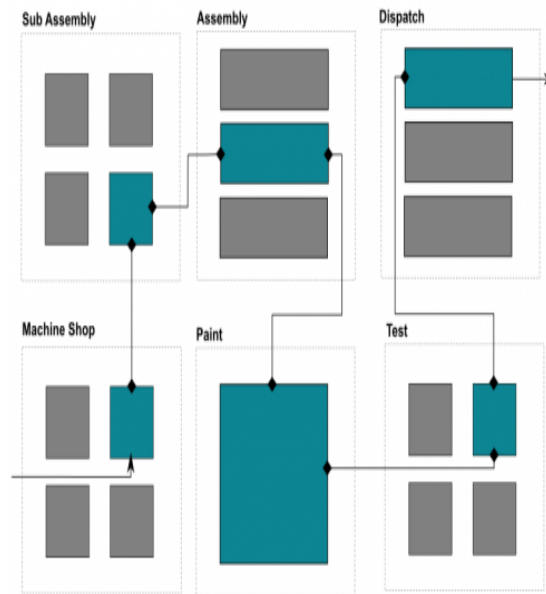
Optimising Product Routing

When all production equipment is connected to the production system, the software application controlling the process has a large amount of data about all the machinery and production equipment throughout the entire production process.

In addition, a software application can perform much more analytics and quality checking on products as they progress through the factory. Product routings can be changed based on feedback from production data, or on data from production machinery further down the production line.

The production software can optimise the production process by adding logic to change routing when:

- Bottlenecks can be avoided by balancing product routing against current process times.
- When sales order volume changes, the product can be rerouted automatically through the fastest path to delivery.
- New products can be routed quicker, with less manual decision making on the shop floor.



An example software HMI layout of a production facility with product routings highlighted.

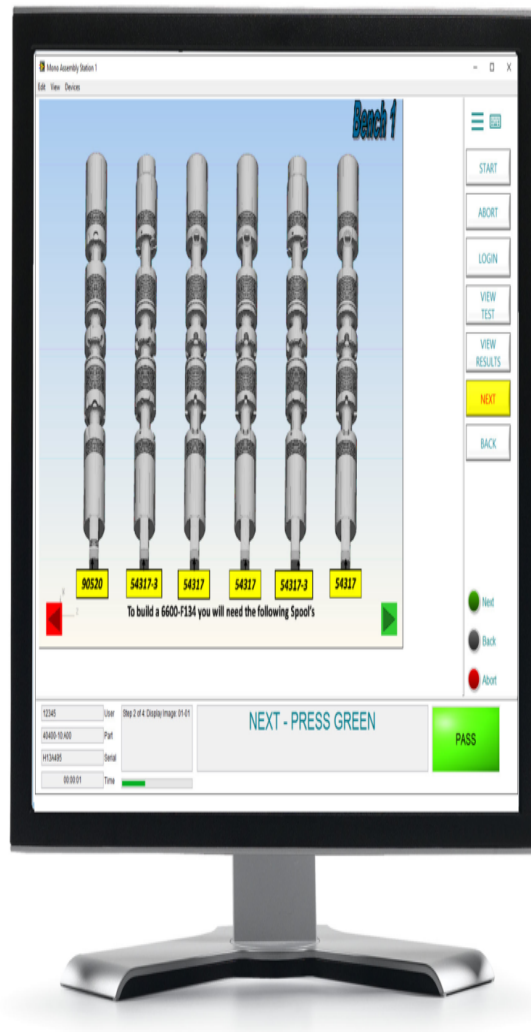
Automatic Delivery of Job Packs

As the software controlling the production systems knows all the production information about the part coming in to be manufactured, it can be connected to CAD and ERP systems to deliver the full job pack with manufacturing information for the production operator.

This ensures that the correct information is delivered for each product when it is required. It also makes the production of small batches of product easier.

Guided Assembly

Human Machine Interfaces (HMIs) can be used to display production work instructions, guiding the operator through any manual production process and displaying production feedback from machinery that is needed for any decision making that the operator needs to take.



A Production Line HMI

When guided assembly stations are combined with sensors, barcode scanners and RFID tag readers, a trackable and traceable production line can be built. As the product moves along the production line, the software system will record each manufacturing operation that has been completed. It can also record component details that have been used in the product.

All this information can be stored in a production database, so that product reports can be generated detailing all manufacturing operations performed and all components used during manufacture.

The key benefits of connected production lines are:

- Quick to produce new products and products with low batch sizes, as production planning and production data can be controlled through the production software.
- Track and Trace production lines with all manufacturing operations recorded and components used.
- Production reports can be generated for products and batches of product
- Insight into the current production status by viewing production data.

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